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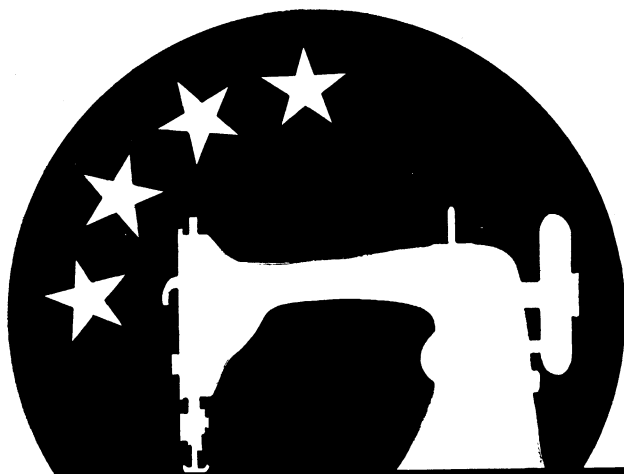
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SEWING MACHINES

Cleaning and Adjusting



FARMERS' BULLETIN No. 1944
U.S. DEPARTMENT OF AGRICULTURE

SEWING MACHINES

Cleaning and Adjusting¹

by

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Making...making over...mending...these are three big wartime as well as peacetime jobs. A sewing machine in good running condition can help do all three. It thus helps families practice the conservation and thrift so essential now.

All well-made sewing machines, new or old, used constantly or idle, can be made to run easily and sew perfectly. Even old machines that have seen generations of household use can be put into first-class condition and need not be exchanged for a newer machine. Parts may need replacing, but the machine will seldom wear out if periodically cleaned, oiled, and adjusted. This cleaning, oiling, and adjusting can be done by the owner without the use of special tools or skill. For perfect and easy sewing, however, certain adjustments must be correct.

This bulletin is prepared as a guide for homemakers in the cleaning, oiling, and correct adjusting of sewing machines. Additional information and assistance in restoring machines to running order is provided by many State extension services through demonstrations in local communities.

¹ Appreciation is expressed to Byron B. Robb, Cornell University; Earle L. Arnold, War Production Board; H. Seymour Pringle, Office of Price Administration; and W. C. Krueger, New Jersey State Agricultural Extension Service, for their assistance in the preparation of this bulletin, and to Mildred Hoseit, Bureau of Human Nutrition and Home Economics, for the illustrations.

GET READY TO CLEAN

The Instruction Book

If you still have it, get out the manufacturer's book of instructions for your particular machine. It contains both directions and illustrations. You will want to refer to them often during cleaning. If the book has been lost, try to get another. Instruction books are not available for all machines, but you may be able to obtain one by writing to the manufacturer of your machine. Give him the name, serial number, and approximate age of your machine.

Equipment Needed

Pie tin for parts and cleaning fluid.

Small cabinet-type screw driver (blade same width as diameter of shank).

Large cabinet-type screw driver.

Knife.

Pliers.

Adjustable-end wrench.

Long needle, stiletto, large pin, stiff wire, or other sharp instrument.

Narrow paint brush or sash brush.

Cleaning cloths.

Cloth for testing stitch.

Can of household machine oil (the kind packaged by gasoline companies or sewing-machine manufacturers).

Large can of cleaning fluid (best for this purpose is cleaning fluid obtained from gasoline dealers. Kerosene may be used if cleaning fluid is not available).

Gasoline should not be used inside buildings. It is highly flammable. Never use gasoline that contains lead.

Small oilcan for cleaning fluid.

A Place to Work

Put the machine where it will be out of the main line of traffic. Place it so the light comes over your left shoulder as you work. Turn rugs well back out of the way. Place newspapers on the floor and against any nearby wall to protect them from oil and grease. Place folded newspapers in the cabinet space underneath the head of the machine.

CLEANING AND OILING

Clean it first is a safe rule to follow if a machine is giving trouble. Dust, grit, lint, and thread easily collect on the working parts of the machine to form, in time, a packed mass soaked and gummed with oil. This gummed oil and dirt will interfere with the free running of the machine, make it run hard, sometimes cause it to jam and lock.

The following directions do not apply specifically to electric machines that have bearings packed in grease, nor to chain-stitch machines. They do apply to lock-stitch machines—either treadle or electric—by far the most numerous in homes throughout the country.

Parts to Remove

When removing parts, remember that “left is loose, and right is tight” on practically all screws, nuts, and bolts found on household equipment. To use a screw driver most effectively, put the pressure on the push, not on the twist. If a screw will not loosen easily, soak it with cleaning fluid, set screw driver in slot, and tap driver sharply with a hammer. Be sure to choose a screw driver with a blade as wide as the slot in the screw is long. Always use a wrench on nuts and bolts—never use pliers.



Left
is
loose



Right
is
tight

Follow the instructions below for taking off, step by step, the parts that must come off for cleaning. *Do not take off other parts.*

Remove spool of thread and bobbin. Lay them aside out of the way, where they will keep clean. If the machine is electrically driven, cover the motor and wires to protect them from the cleaning fluid and oil.

Remove and put in the pie tin the following parts: Needle ... presser foot ... slide plate or plates ... bobbin case ... the throat plate, or needle plate ... armplate, or cover plate or plates ... and the faceplate (figs. 1 and 2).

CAUTION: If a machine is one that has no faceplate, do not open or remove at this time the needle-bar housing, which is the left-hand end of the machine. This housing usually is held together with screws that show on the right-hand side of the housing. (See fig. 7.) On some machines when these screws are removed, the needle bar and sometimes the presser bar separate from the main shaft in the head and fall out.

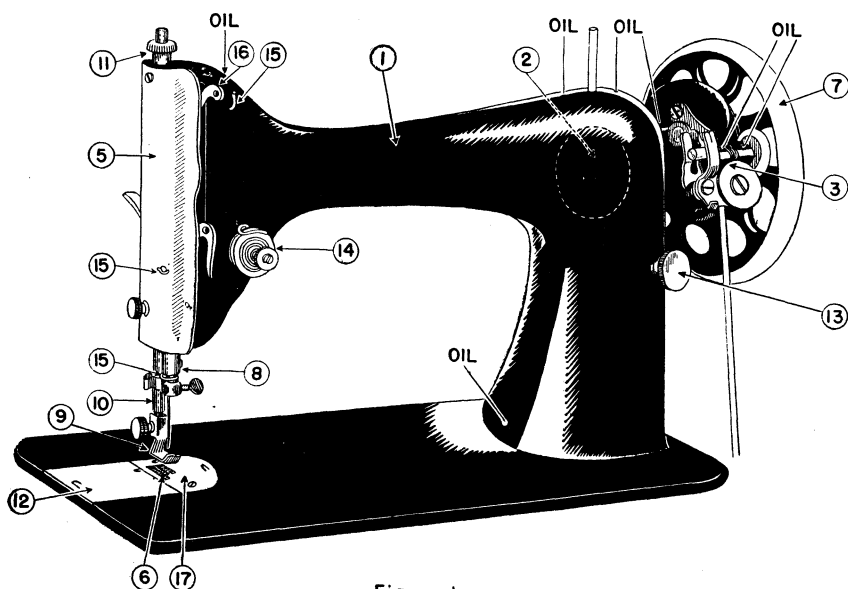


Figure 1

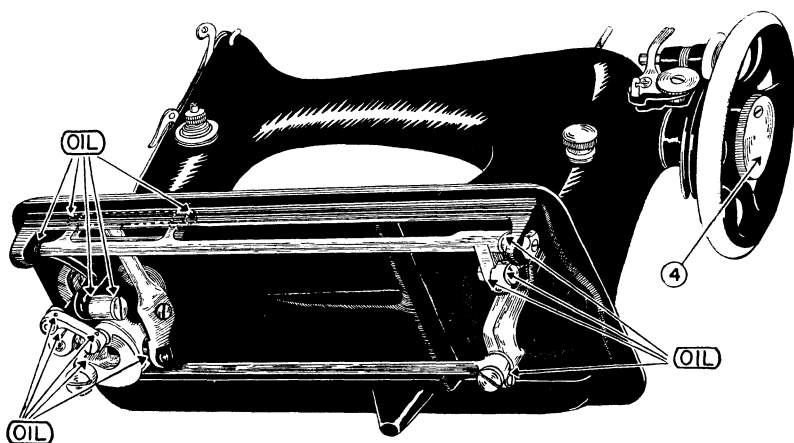


Figure 2

Two Views of a Lock-stitch Machine.

- | | |
|------------------------------|---|
| 1. Arm. | 10. Presser bar. |
| 2. Armplate, or cover plate. | 11. Pressure-control screw. |
| 3. Bobbin winder. | 12. Slide plate. |
| 4. Clutch. | 13. Stitch-length control or regulator. |
| 5. Faceplate. | 14. Tension. |
| 6. Feed dog. | 15. Thread guide. |
| 7. Handwheel. | 16. Thread-take-up lever. |
| 8. Needle bar. | 17. Throat plate, or needle plate. |
| 9. Presser foot. | |

Use Cleaning Fluid

With the sharp-pointed instrument, clean out all oilholes (fig. 1). Then run the machine, and at the same time squirt cleaning fluid into all oilholes, on all bearings, and on all other places where one part rubs against or turns within another.

WARNING! *Do not run an electric machine by motor before all cleaning fluid has evaporated. A fire may start.*

If the machine begins to run hard, it is a sign that some dirt has rolled and jammed inside a bearing. Run the machine continuously until dirt and gummed oil are washed from bearings by continued applications of cleaning fluid and the machine runs easily again. Tip back the head and similarly flush the parts underneath (fig. 2). Let down the head and run the machine as before.

To remove any remaining gummed dirt and oil, pour some cleaning fluid into the pie tin with the parts. Dip the brush in the cleaning fluid and clean and scrub thoroughly all the parts of the machine you can reach with the brush—the parts in the needle-bar housing (fig. 3)...around the feed works...shuttle case and shuttle-driving mechanism...stitch regulator...all bobbin-winder parts...those under the head of the machine... and as far as you can reach inside the arm.

Use a pointed instrument, a knife, or screw driver to remove by digging or scraping any gummed oil and dirt remaining around the feed dog...inside the tip of a long-bobbin shuttle...inside the round bobbin case (fig. 4).

Run the point of a fine needle or draw a thread under the spring of the lower tension on shuttle or bobbin case to make sure no thread or dirt is wedged under the spring (fig. 5). You may need to remove the tension spring in some cases.

Some round-shuttle machines have a piece of felt in the shuttle race for

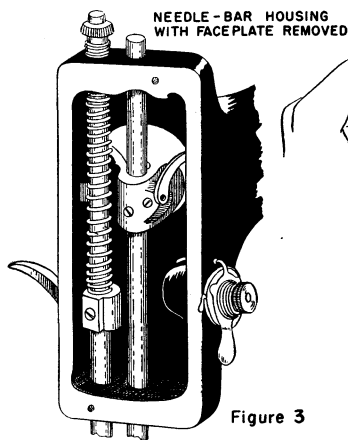


Figure 3

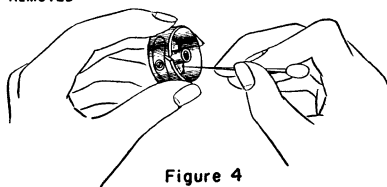


Figure 4

LONG-BOBBIN SHUTTLE

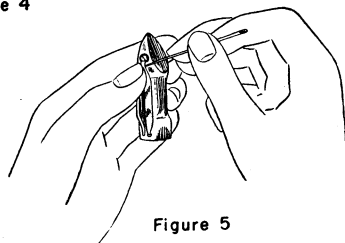


Figure 5

oiling it. Soak this felt with cleaning fluid and brush, but do not remove it. In a long-bobbin machine, clean the race with a cloth wet with cleaning fluid.

Many long-bobbin machines have an oil well about one-fourth inch in diameter underneath the shuttle slide plate near the front end of the shuttle race. Take out and clean the wool material that holds the oil in this oil well. Then, with a pin, clean the small hole that leads from the oil well to the shuttle race. If the wool is dirty or missing or if some material other than wool has been put in this oilhole, put a fresh wad of either raw wool or wool yarn in the hole.

To clean the upper tension, pull a piece of cloth soaked in cleaning fluid back and forth between the disks or surfaces of the upper tension to polish them. Repeat with a dry cloth. Be sure no lint or thread remains wedged in it.

Unwind or pick out with the needle any thread that has wound around the bearings of the handwheel. Such thread may also cause a machine to run hard.

Clean the clutch on the handwheel if the wheel does not turn freely without operating the rest of the machine when the lock nut is loosened. To clean the clutch, loosen screw *A* in the lock nut that holds the handwheel tight when sewing (fig. 6). Unscrew the lock nut, remove the adjusting washer or washers, and take off the handwheel. Clean and oil the handwheel bearing. Replace the wheel, the adjusting washer, and lock nut. Tighten screw *A*. Now turn the lock nut backward until the end of screw *A* bumps a lip on the adjusting washer, and see if the handwheel turns freely without running the machine. If not, again remove the lock nut, remove the adjusting washer carefully, and rotate it one-half turn. Replace the parts and tighten screw *A*. Check to be sure the handwheel turns freely when the lock nut is loosened.

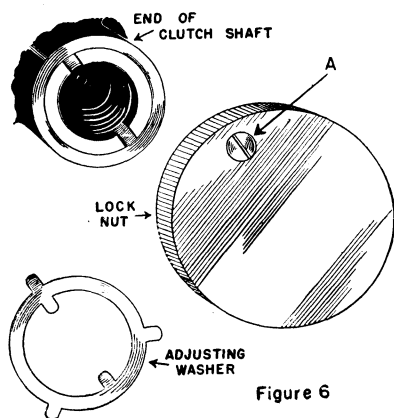


Figure 6

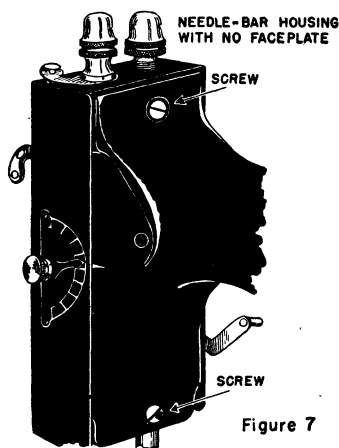


Figure 7

Now, if you have expert instruction or assistance, open the needle-bar housing on a machine without a faceplate. Be especially careful of those machines that have no feed dog. Be sure to unscrew only those screws that actually hold together the two parts of the needle-bar housing (fig. 7).

Watch carefully how the needle bar, presser bar, and small roller in the needle-bar cam drive come apart, so that you can remember where and in what order to put them back. Brush and clean these parts with the cleaning fluid; wipe them dry. Also clean and wipe dry the inside of the needle-bar housing.

Oil all parts freely, wipe away the excess oil, and put back the parts immediately. If the roller is worn it must be put back without reversing; otherwise it may turn hard or stick.

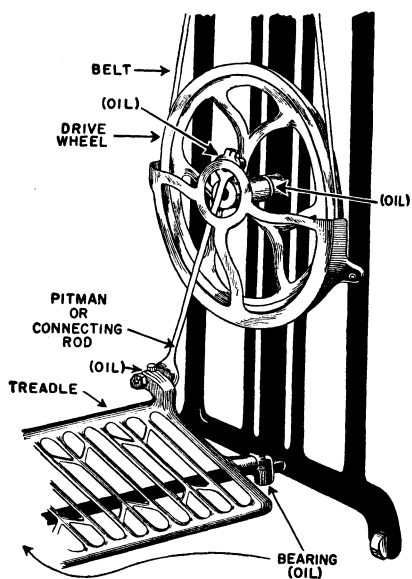


Figure 8

Treadle Mechanism

Now clean the driving mechanism of a treadle machine while the head is drying.

Remove all threads and dirt from the five or six bearings of the mechanism. Usually there is a bearing at each end of the treadle, one at each end of the pitman, or connecting rod, and either one or two bearings supporting the band or drive wheel (fig. 8). Remove any thread from these bearings.

Squirt cleaning fluid into each bearing, run the machine with the treadle, then wipe dry. When they are thoroughly dry, oil each bearing, run the machine, and then wipe away any excess oil.

Oil the Machine Head

It is better for bearings to be thoroughly dry before they are oiled. If kerosene has been used as the cleaning fluid, let the machine head dry for about 24 hours. Or wash the kerosene from the bearings of the machine by using extra amounts of oil.

Squirt oil freely into all oilholes and wherever one surface rubs against or turns within another (fig. 9). Use oil freely, because all oil has been removed from the bearings by the cleaning process. *Never oil the tensions.*

Run the machine to work the oil thoroughly into all the bearings. When oiling is completed, wipe all excess oil from all parts of the machine. This excess oil collects dust. And too much oil on the shuttle race or needle can cause skipped stitches.

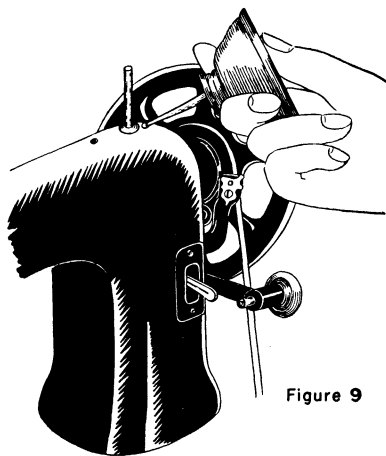


Figure 9

Be sure to oil any wool or felt that feeds oil to the shuttle race. Put oil on the wool in the oilhole under the shuttle slide plate of long-bobbin machines with such a hole. Some long-shuttle machines have a block of felt or ball of wool so set against the front end of the shuttle race that the point of the shuttle touches it and carries oil back along the race as the shuttle operates. On machines with no such device, wipe a thin film of oil on the race with a cloth or your finger.

OIL REGULARLY.—For later oilings, one drop of oil in each bearing and oilhole is enough. It is good practice to oil the machine after each day's work or after 8 to 10 hours of use. Oil occasionally, whether the machine is used or not, to keep the oil from drying and gumming.

Replace Parts

After oiling the machine head, clean, wipe dry with a clean cloth, and put back on the machine all parts that were placed in the pan. When you put them back, never force parts or screws into place. You may damage or break them. If a screw balks, probably it does not belong in that place. Again remember "left is loose; right is tight"—or screws and nuts tighten if you turn them in a clockwise direction.

Run the machine with some waste cloth under the presser foot to absorb excess oil from around the needle and the feed works. Be sure the presser foot has been pushed back into its clamp as far as it should go so that the slot in the presser foot is directly above the needle hole in the needle plate and the sides of the slot are parallel to the sides of the feed dog.

Motor and Motor Control

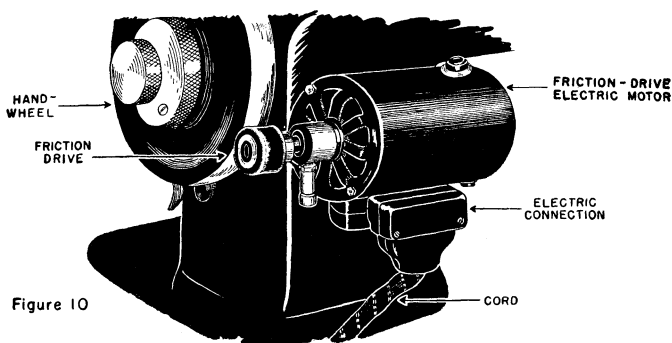


Figure 10

Lubricate the electric motor according to the manufacturer's instructions. Some motors need to be lubricated only once a year; some need no lubrication. Some require grease; others, oil. Using too little lubricant, the wrong kind, or too much may ruin a motor.

Check to see that all electric connections to the motor control and motor are tight. If the cord covering is not in good condition, tape it or, if necessary, replace the cord. The belt that connects the motor to the handwheel should have just enough tension to keep it from slipping. On some machines the belt can be adjusted by slightly shifting the position of the motor.

Take good care of the rubber driving ring or wheel on motors that drive machines by friction contact with the handwheel (fig. 10). If this driving ring or wheel becomes flat-sided or unevenly worn, causing excessive vibration, replace it with a new one. Keep the handwheel clean and dry, the driving ring adjusted firmly to the handwheel and in line, and the machine will run with a minimum of vibration.

ADJUSTING THE MACHINE

Needle

Sewing-machine needles come in many styles, differing as to needle length and shape of the shank. Each style of a given brand has its own number. Each style can be used in a number of different machines. (See illustrations, p. 21.)

The needle should be of the correct length, sharp and straight. It needs to be so set in the needle-holding clamp that the short groove on the needle faces the shuttle point or hook as it passes the needle (fig. 11). In all the newer machines the needle sets up against a stop pin in the needle bar.

To make sure a needle is the right length, watch the shuttle as it crosses the needle during stitching. The point or hook of the shuttle should cross the needle so that the shuttle point enters the loop of thread at its broadest point to form the stitch. Too short or too long a needle or one set too high or too low causes skipped stitches. On some machines a needle that is too long will break or bend or cause the upper thread to break.

It's a good idea to scratch two marks in the paint on the machine to indicate correct length between end of shank and eye of needle to guide you when buying a new needle.

A dull or blunt needle pulls threads, causing side puckers when stitching. To sharpen, take the needle between the thumb and middle finger, roll it and at the same time draw it lengthwise over a fine emery stone. Guide with the forefinger.

Replace a needle that is bent or badly blunted or one with such a sharp eye that it breaks the thread.

A bent needle in the machine may strike the edge of the presser foot, the edge of the needle hole, the needle plate, or the edge of the shuttle. If this does not break the needle, it will blunt it. It may also roughen the edge of the presser foot and the needle hole.

To make a rough test for needle straightness, hold the shank of the needle between the thumb and forefinger. Roll the needle, watching the point. The point should remain in the center. The point of a bent needle will swing in a circle.

To weed out a needle that may be only so slightly bent that the above test does not reveal the fact, make the following test. Set the needle in the machine. Now lower it slowly into the needle hole. The whole length of the needle should "follow through" the needle hole in the same position in which the point entered it.

The position of the needle bar needs to be adjusted if a straight needle, correctly set, enters near the edge instead of in the center of the needle hole. On some machines without a faceplate, you can adjust the needle bar by loosening the screws that hold the front of the needle-bar housing and moving the housing until the needle does enter the center of the hole. Hold the housing firmly as you retighten the screws.

On machines with a faceplate or with a needle-bar housing that separates at the needle bar do not try to change the needle bar position without expert help.

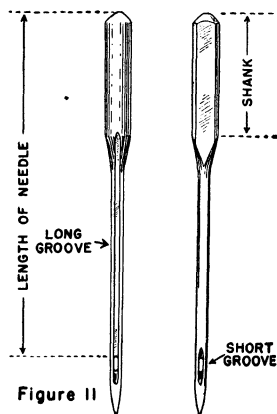


Figure 11

Threading

Refer to your instruction book. The thread should run from the spool to the upper tension, to the thread take-up, and then to the needle. Various guides hold the thread in the correct position as it feeds to those three main points—tension, take-up, and needle. Pass the thread through the needle from the side with the long groove to the side with the short groove.

Place the bobbin in its case or shuttle. Pull the thread under the lower or bobbin tension, according to the instruction book. In most machines the bobbin should rotate in a counterclockwise direction as the thread unwinds. If the shuttle is not threaded correctly, the thread may catch and break, or loops may form in the stitching along the top side of the cloth. If the bobbin is put in the bobbin case incorrectly, the case may unthread.

Stitch-Length Control

Different machines have different types of control for adjusting the length of stitch. This control should be free to move so that it can regulate the stitch over the entire range of stitch lengths possible on the machine. During cleaning and oiling, the screw, lever, or slide that adjusts this control may have been set for a very short stitch. If the control is set for an extremely short stitch, the feed dog will not feed the cloth through the machine. To correct this, increase the length of stitch until the feed dog moves forward and backward as well as up and down.

Tensions

Upper and lower tensions must be balanced to produce a perfect stitch. The upper tension varies in location on different machines. It may be on the faceplate, on the face of the needle-bar housing, on the front of the needle-bar housing, or on the upper arm of the machine head. It is adjusted by a thumb nut.

The lower tension, located on the shuttle or bobbin case, is adjusted by a screw. If two screws fasten the lower tension spring to the bobbin case, adjust by turning the screw nearest the center of the spring—not the screw on the end.

If, during the cleaning, the lower tension spring has not been removed or its adjustment changed, the adjusting procedure is the same as in the ordinary use of the machine. That is, assume the lower tension to be correct until proved wrong, and make all adjustments on the upper tension.

If the lower tension has been disturbed, set by guess both lower and upper tensions so there will be some drag on each thread. Use the same size thread on both bobbin and spool. Assume the lower tension to be correct until proved otherwise by testing, and make all adjustments on the upper tension.

Now, to guide you in the adjusting, take a look at the stitching the machine makes. Set stitch-length control for a medium length of stitch. Fold a 6- or 8-inch square of sheeting or average-weight cloth and stitch diagonally across it at an angle of about 45°.

Now, inspect the stitching (fig. 12). A perfect stitch will have threads locked in the center midway between the two layers of cloth, with no loops on the top or bottom of the seam and no puckers in the cloth. If loops of the bobbin thread show on the top side of the seam and the top thread is straight, the upper tension is tighter than the lower. If loops of the spool thread show on the underside of the seam and the lower thread is straight, the upper tension is looser than the lower. (See fig. 13.)

To make a closer test of tension balance, grip the ends of the bias stitching between the thumb and first finger of each hand. Pull evenly, strongly enough to break threads. One of four things happens, which shows the condition of the tensions:

1. The upper thread only may break. This shows that the upper tension is *tighter* than the lower.
2. The lower thread only may break. This shows that the upper tension is *looser* than the lower.
3. Both threads may break. This shows that the tensions are balanced. The stitch may be perfect. However, if the cloth puckers at the same time, both tensions are too tight.
4. Neither thread may break. This shows that tensions are balanced but both are too loose.

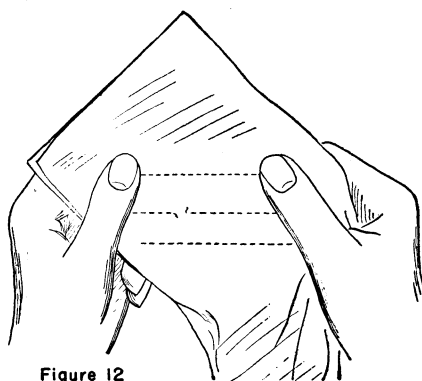


Figure 12

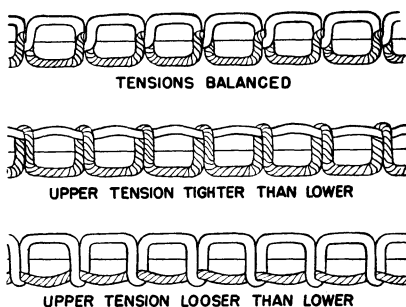


Figure 13

Here is the way to make adjustments in the preceding cases:

1. If the upper thread breaks, loosen the upper tension by turning the adjusting nut about one-fourth of a turn to the left. Make another diagonal seam and test the stitch again. Repeat if necessary, changing the upper tension by slight turns until tensions are balanced—that is, until both threads break at the same time or until neither thread breaks. They may both need to be loosened or tightened, as described in 3 or 4, below.

2. If the lower thread breaks, tighten the upper tension by turning the adjusting nut about one-fourth of a turn to the right. Make another diagonal seam and test the stitch again. Repeat if necessary, changing the upper tension by slight turns until tensions are balanced—that is, until both threads break. Again, if the cloth puckers follow directions in 3.

3. If both threads break, no adjustment is needed unless the cloth puckers. If the cloth puckers, loosen the lower tension first; then adjust the upper tension as in 1 above. Repeat the adjustments until the result is a perfect stitch—with tensions balanced and no puckering of the cloth along the seam.

4. If neither thread breaks, tighten the lower tension slightly. Then obtain a balance by tightening the upper tension a little at a time, as in 2 above.

Tension Feed

You will not be successful in adjusting the upper tension if the upper thread tends to feed irregularly, if it feeds too freely, or if it catches. In any of these cases, take the upper tension apart. Remove each piece separately, step by step, and place the parts in order where they will not be disturbed. If the thread has worn a groove in the metal, smooth and polish such a surface on a fine emery stone or whetstone. Replace the parts. Tension disks belong back to back and not lip to lip or spoon fashion. A weak or broken tension spring should be replaced.

Thread-Take-up Spring

Some machines do not have a thread-take-up spring. On those that do, it is a small spring usually located at or near the upper tension so that the thread passes through it after it leaves the upper tension and before it passes through the take-up lever. If the spring is broken or missing, replace with a new one. Two types of adjustments may be needed on the take-up spring to prevent staggered stitches.

1. Turn the handwheel slowly by hand and watch the action of the thread-take-up spring as the needle enters the cloth. The spring should release the tension on the thread—just as the eye of the needle is about to enter the cloth. If the spring comes to rest too soon or after the needle enters the cloth, locate and loosen the screw *A* that fastens the take-up-spring holder (fig. 14). Now rotate the holder until the correct adjustment is made and then tighten screw *A*. Since different machines adjust differently, refer to your instruction book or study the machine carefully until you determine where the adjusting screw is located and how to make the adjustment. It may not be possible to make this adjustment on some types of machines.

2. If the take-up spring seems weak and does not return to its stop position regularly, it needs another type of adjustment. On many machines the spring is held in place by the split bolt which passes through the tension disks. To adjust the spring, remove tension-adjusting nut, tension-adjusting spring, and tension disks (fig. 15). Then replace the tension-adjusting nut on the split bolt to about the depth of the nut and unscrew the bolt with a screw driver. Replacing nut on the end of the bolt keeps screw driver from spreading the end of the bolt.

When the bolt is loosened, rotate the spring around the bolt about one-fourth of a turn. Tighten the split bolt, and test the take-up spring to see if it now has the right amount of tension to draw the slack from the thread and always to return to its stop. If it is not yet correct, again loosen the split bolt and rotate the spring so as to increase or decrease the tension as needed. Repeat this operation until the spring is adjusted so that it functions properly. Then reassemble the parts of the tension that have been removed.

If your machine is one in which the take-up spring is not held in the way described above, you can probably determine how to increase or decrease the tension on it by examining it carefully.

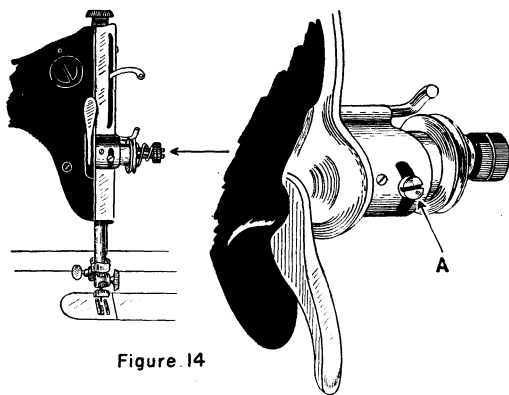


Figure 14

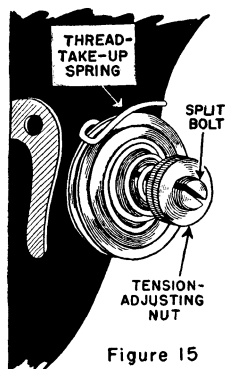


Figure 15

Bobbin Winder

Check to see if the bobbin winder works as it should. If the bobbin winder has a rubber ring which does not press hard enough against the wheel to wind the bobbin, loosen the adjusting screw *A*, press the winder lightly against the hub of the hand-wheel; then tighten the adjusting screw (fig. 16).

Take good care of the rubber ring. Never get oil on it. Oil or grease makes the ring slip and swell and spoils the rubber. If the ring has lost its "stretch" replace it.

If thread piles up at one end of the bobbin, adjust the arm that guides the thread as you wind the bobbin. Most thread-guide arms have a narrow place near the center where they bend rather easily. With pliers, grip the arm above this point and bend it away from the end of the bobbin at which the thread heaps up (fig. 17).

If the drive wheel of the bobbin winder on a long-shuttle machine will not turn the cam wheel, the cam wheel may need adjusting (fig. 18). Check to see if the center bolt *A*, which is the bearing of the cam wheel, is gummed with dirt or has rotated out of adjustment. A slight turn of this bolt moves the cam wheel toward or away from the drive. Loosen the nut on the back end of this bolt, rotate the bolt with a screw driver until the teeth on the cam wheel engage the teeth on the bobbin drive, then tighten the nut. Check to see that the entire mechanism runs freely.

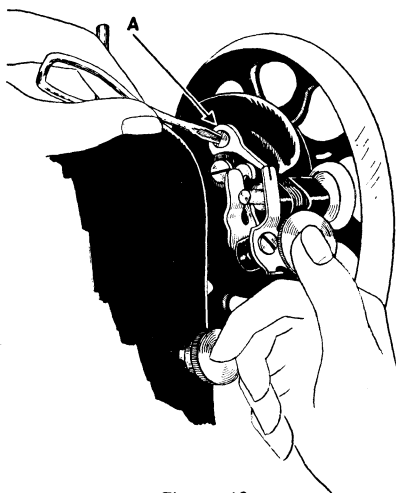


Figure 16

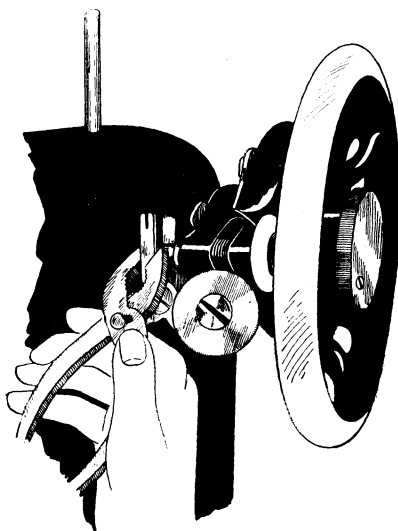


Figure 17

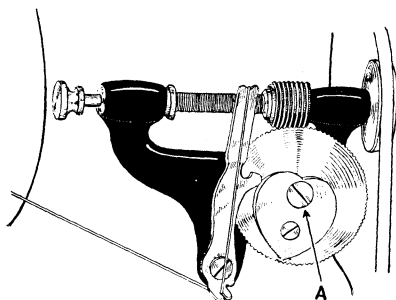


Figure 18

Feed Dog

The feed dog, which pushes the material along, seldom needs replacing. How well it works depends upon the setting of the feed dog and the adjustment of the pressure on the presser foot.

If the feed dog is set correctly, at its highest position the bottoms of the notches formed by the teeth are even with the top surface of the throat plate. If it is set too high, it will cause material to pucker along a line of stitching. To adjust, loosen the screw *A* that holds the feed dog in place, move the dog to the correct position and tighten the screw. Whether this screw is on the left or right side of the feed works depends on the kind of machine (figs. 19 and 20).

Presser Foot

The way material feeds through the machine depends in great part on the pressure of the presser foot on the feed dog. The operator while continuing to sew should be able to swing the cloth in any direction or make a complete loop or turn without raising the presser foot. This freedom of operation will be reduced as the pressure on the presser foot is increased.

This pressure is adjusted by turning the pressure-control screw at the top of the presser bar on top of the needle-bar housing (fig. 1, p. 5). Maintain only enough pressure on the presser foot to keep the cloth moving and have the machine make a straight seam. If the pressure is too light, the cloth may slip from side to side, causing staggered stitches and a crooked seam. Too much pressure makes the machine run hard and may leave marks of the feed dog on the material. Less pressure usually is required for thick or bulky material than for thin material. If the above adjustment is correctly made, the pressure is light enough so that sewing over a pin will not blunt or break the needle.

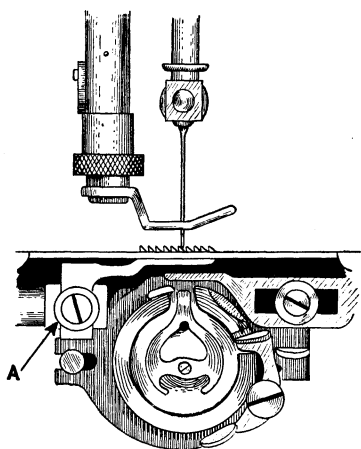


Figure 19

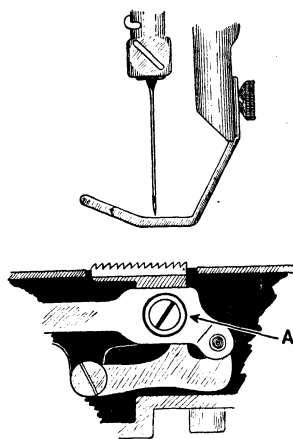


Figure 20

Shuttle and Shuttle Cradle

A blunt or worn shuttle causes skipped stitches. You may be able to sharpen a blunt shuttle with a fine emery stone or a whetstone. Sharpen it from the rounded side, never on the flat side.

Rough or sharp edges on the shuttle, the shuttle cradle, or the shuttle spring may catch, break, or damage the thread. Smooth these rough edges with fine emery stone or whetstone.

Check the adjustment of the shuttle cradle on a long-shuttle machine to see if thread passes freely between shuttle and cradle. If the thread does not pass freely, correct the condition by loosening the screw that holds the cradle, moving the cradle slightly away from the race, and then tightening the screw again firmly.

Treadle and Belt

If the treadle is loose and noisy, tighten the bearing at whichever end of the treadle is most convenient to reach. Place a screw driver in the slot of the adjusting bolt, hold it firmly as you loosen the lock nut with the wrench (figs. 21 and 22). With the screw driver, tighten the bolt until it is just tight; then loosen it slightly. Tighten the lock nut. Run the machine. *CAUTION: A bearing that is too tight makes the machine run hard.*

If the treadle still runs noisily, some other bearing may need adjusting. Many drive-wheel bearings may be adjusted as described above. Connecting-rod bearings adjust in many different ways. Study the machine carefully before attempting to adjust these bearings. Don't try to adjust ball bearings.

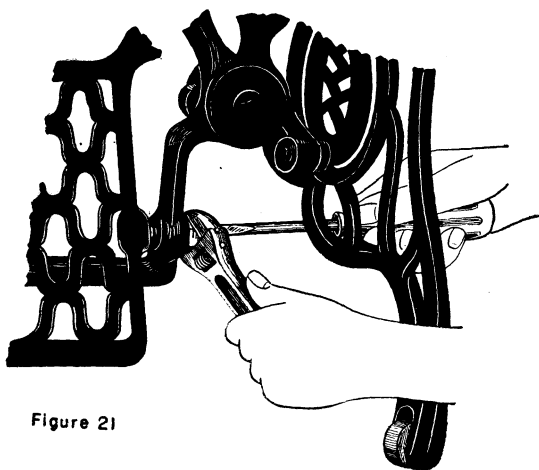


Figure 21

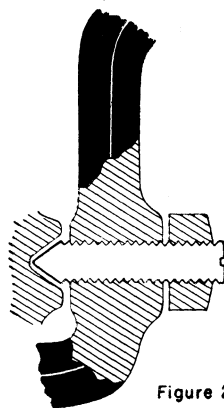


Figure 22

If the leather drive belt is too loose, shorten it as follows: Open the hook that holds the belt ends together, pull the belt tight, and measure carefully how much of the belt should be cut off; then cut. Punch a new hole in the belt. All sewing-machine belts have a flat, smooth side. Lay the belt on a hard surface and punch the hole with the stiletto or ice pick down through this flat side straight through to the other side of the belt. This makes a hole that will not pull out. Be careful not to tear the leather at the hole. Hook the two ends together and flatten the hook with the pliers.

RUNNING THE MACHINE

Always be sure before you start to use a machine that it is wiped clean.

Select the thread, either cotton or silk, of a size to suit the material you are sewing on. Finer thread is used for machine sewing than for hand sewing. The table in your instruction book will guide you in making the correct selection of thread for a given material. The finer the material the finer the thread.

Use a needle of the right size for the thread. (See p. 20.) A needle that is too coarse will poke holes in the cloth too large for the thread to fill or will cause skipped stitches.

Use the same size thread on the bobbin as on top of the machine, except when you want special stitching effects.

If the machine has no automatic bobbin winder release, be careful not to wind the bobbin too full or too tight or the thread may break in stitching. It is good practice not to wind on a bobbin partly filled with thread. You may be deceived later about the amount in the top winding and forget what kind of thread is underneath. If you lack bobbins and must wind on top of another thread, be sure the thread ends underneath are caught under the new thread and not left loose to tangle and cause the new thread to break.

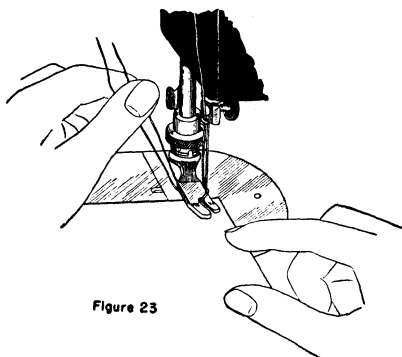


Figure 23

Set the stitch length; then, if necessary, adjust the upper tension to suit the thread and material. For ordinary sewing on a lock-stitch machine 12 to 16 stitches to an inch is about right. Use a longer stitch for heavy material; a shorter one for fine. If stitch length isn't specified on the stitch control, count the stitches in a measured inch of sewing.

Pull enough thread through the needle to keep the needle threaded when the take-up lever rises to its highest point. Pull the under thread up from the bobbin and draw both threads back under the presser foot and hold them loosely until you start to stitch (fig. 23). This prevents bunching of thread during the first few stitches.

Place the material so the needle will be sure to go through the cloth; then lower the presser foot. In general it is best to stitch with the seam at the right-hand side of the goods. This is more convenient for the right-handed worker and keeps the material from being crushed and wrinkled in the limited space under the head. For this reason the seam guide is attached to the plate at the right of the feed dog. Never try to hasten the feeding of the material through the machine by pushing or pulling it while stitching. This will produce imperfect stitches and cause the needle to bend or break. When the end of a line of stitching is reached, stop the machine before the stitching runs off the material. Bring the take-up lever to its highest point, raise the presser foot, cut the thread, and remove the material. Then there will be enough thread to start the machine again.




A machine kept clean, oiled, and correctly adjusted should produce perfect stitching. If there is any difficulty in securing good results, consult the summary of machine troubles and their possible causes (pp. 22-23) and make the adjustments indicated.

Thread and needle sizes

Thread sizes		Needle sizes				
Cotton	Silk	White Sewing Machine Co.	Singer		Wheeler & Wilson	
			Old	New	Old	New
150-300	000	00	0	9	2	10
90-150	00	0	B	11	3	12
70-90	0	1	$\frac{1}{2}$	14	4	14
50-70	A and B	2	1	16	5	16
30-50	C	3	2	18	6	18
20-30	D	4	3	19	7	20

INTERCHANGEABLE NEEDLE LIST

Suitable needles for given machines, indicated by various code designations

Names of sewing machines	Brewer Sewing Supplies Co.	Boye Needle Co.	Bryson's Universal Code	Crowley	National Sewing Machine Co.	Singer	The Torrington Co. (key letter)	Needles (actual size)
Domestic.....	J	16	Y	62	D	15X1	Y	
Free.....	J	16	Y	62	D	15X1	Y	
New Home, Rotary.....	J	16	Y	62	D	15X1	Y	
New Royal A.....	J	16	Y	62	D	15X1	Y	
Singer, 15, 27, 66, 101, 115, 127, and 201.....	J	16	Y	62	D	15X1	Y	
Eldredge, 2 Spool.....	R	16	Y	62	D	15X1	CC	
Franklin.....	R	16	Y	62	D	15X1	CC	
Kenmore.....	R	16	Y	62	D	15X1	CC	
White, Rotary.....	R	16	Y	62	D	15X1	LL	
Danascus.....	M	6	Y	62	D	15X1	BB	
Minnesota H.....	M	6	Y	62	D	15X1	BB	
Standard, Rotary.....	M	6	Y	62	D	15X1	BB	
Brunswick.....	E	14	Z	56	C	20X1	J	
Danascus.....	E	14	Z	56	C	20X1	J	
Eldredge, Rotary.....	E	14	Z	56	C	20X1	J	
National, Rotary.....	E	14	Z	56	C	20X1	J	
Western, Electric.....	E	14	Z	56	C	20X1	J	
Westinghouse.....	E	14	Z	56	C	20X1	J	
New Home, Vibrator.....	G	4	Z	56	C	20X1	R	
Minnesota I.....	G	4	Z	60	C	20X1	R	
Singer, V. S. I.....	K	4	Z	60	C	20X1	X	
New Royal.....	I	24	Z	71	C	20X1	T	
Franklin, Vibrator.....	P	12	Z	66	C	20X1	KK	
White, Vibrator.....	P	12	Z	66	C	20X1	KK	
New Domestic.....	D	8	1&	52	A	1X4	H	
Household.....	H	2	&2	58	F	1X7	M	
Wheeler & Wilson 9.....	O	18	X2	68	E	9N1	HH	
Davis, New Style—Long.....	C	10	1X	54	B	1X2	F	
White, Old Style.....	T	20	&4	70		1X1	N	
Wilson, Oscillating ¹	T	20	&4	70		1X1	OO	

Material from the Bryson's Interchangeable Needle List. Used by permission of the White Sewing Machine Company.

¹ Needle for Wilson Oscillating machine is longer than needle shown.

MACHINE TROUBLES

Some of the more common troubles	Possible causes	Page
<i>Machine runs hard</i>	Lack of oil Thread wound around wheel and treadle bearings Gummed oil or dirt in bearings Tight bearings Belt too tight Bobbin winder against wheel or belt during stitching	9 7, 8 6 18
<i>Imperfect stitches:</i> Looped stitches on top of cloth or upper thread lies straight along top of cloth.	Upper tension too tight or lower too loose Bobbin incorrectly threaded Dirt, lint, or rust between upper tension disks . . Dirt, lint, or pieces of thread under lower tension spring	13-14 12 7 6
Looped stitches on lower side of cloth or lower thread lies straight along bottom of cloth.	Incorrect threading Upper tension too loose or lower too tight Dirt, lint, or rust between upper tension disks . . Dirt, lint, or pieces of thread under lower tension spring Dirt, or lint in end of shuttle or bottom of bobbin case Shuttle too tight in shuttle carrier	12 13 7 6 6 18
<i>Skipped stitches</i>	Needle bent Needle too small for thread Needle set too high or too low Needle set wrong side out Needle incorrectly threaded Needle too long or too short Oil on needle or too much on shuttle race Shuttle point blunt or worn	11 19 11 10 12 11 9 18
<i>Staggered stitches</i>	Too little pressure on presser foot Take-up spring weak, broken, or missing Incorrect adjustment of take-up spring	17 14 14-15
<i>Stitches of uneven length</i>	Improper pressure on presser foot Feed dog not adjusted properly Dirt around feed works	17 17 6
<i>Upper thread breaking</i>	Poor, knotty, or rotten thread Machine threaded incorrectly Needle set wrong side out Needle set too high or too low Needle bent Needle too fine for thread Needle threaded incorrectly Needle rubs against presser foot, needle plate, or shuttle Rough or sharp places on shuttle or eye of needle . Upper tension much too tight In long-shuttle machine—not enough clearance between shuttle and shuttle cradle 12 10 11 11 19 12 11 18, 11 13 18

MACHINE TROUBLES—Continued

Some of the more common troubles	Possible causes	Page
<i>Lower thread breaking.</i>	Poor, knotty, or rotten thread	13
	Lower tension much too tight	12
	Bobbin case or shuttle threaded incorrectly	11
	Bur or sharp edges on needle plate	19
	Bobbin wound too loosely or too tightly	19
	Bobbin wound too full	16
	Bobbin wound unevenly	18
	Rough or sharp edges on bobbin shoulders	18
	Rough or sharp edges on lower tension spring	6
	Dirt or thread in shuttle cavity so bobbin cannot turn freely	6
	Packed lint in shuttle or bobbin case	
<i>Material not feeding through machine correctly.</i>	Stitch-length regulator turned too far so feed is not acting	12
	Dirt under needle plate around feed dog	6
	Incorrect setting of feed dog	17
	Incorrect pressure on presser foot	17
	Bent presser foot or feed dog	
<i>Bobbin won't wind correctly.</i>	Drive wheel on winder not bearing heavily enough on handwheel or belt	16
	Rubber tire on bobbin-winder wheel loose, oily, or worn	16
	Thread guide on winder bent so thread piles up at one end of bobbin	16
	Cam wheel that operates thread guide not turning freely	16
	Cam wheel that operates thread guide incorrectly set	16
<i>Clutch not releasing hand-wheel.</i>	Handwheel bearing gummed	7
	Clutch bound with thread or gummed with dirt, thread, or oil	7
	Incorrect assembling	7
<i>Handwheel hard to turn or set.</i>	Thread jammed in shuttle race	6
	Thread or dirt in bearings	7
	Bearings rusted or gummed	6
	Bearings too tight	7
<i>Runs noisily.</i>	Lack of oil	9
	Loose bearings	18
	Shuttle loose in its carrier	18
	Loose bobbin case	
<i>Puckers in cloth:</i>		
Seam puckers	One or both tensions too tight	13
Side puckers	Dull needle	11
<i>Needle breaking.</i>	Pulling the material while stitching	20
	Needle too long or set too low	11
	Presser foot incorrectly attached	9
	Failure to raise needle before removing material	20

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